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Summary: Among 4 classification systems of SSP tendon retraction, Lhee classification was most valuable in predicting reparable and RCI after ARCR.

Data: Purpose: This study aimed to determine which classification system of the supraspinatus tendon retraction is most valuable for predicting the reparability and rotator cuff integrity (RCI) after arthroscopic rotator cuff repair (ARCR). Methods: This retrospective study was performed on 463 consecutive patients who underwent ARCR for full-thickness tear. The inclusion criteria were patients who with full-thickness supraspinatus (SSP) tear and a minimum of 12 months follow-up. Patients with partial-thickness tear, osteoarthritis, instability, or a history of previous shoulder surgery were excluded. The degree of tendon retraction was assessed by the position of the retracted torn tendon in the coronal view of MRI by two shoulder surgeons who were not aware of the patient’s information, and tendon retraction was evaluated according to 4 types of classification systems (Patte, French Arthroscopy Society (SFA), Kim, Lhee). Retear after ARCR was defined as Sugaya type IV and V. Using the receiver operating characteristic (ROC) curve and the area under the curve (AUC), the ability of each classification system to predict reparability and retear after ARCR was evaluated. The cut-off point of each classification system was determined according to Youden index. Results: 403 patients met our inclusion criteria for reparability and 370 patients for RCI with retear rate of19.2%. For the prediction of reparability, the AUC of Patte, SFA, Kim, and Lhee were 0.685, 0.784, 0.738, and 0.823, respectively. The AUC of Patte was significantly smaller than that of SFA and Lhee (p<0.015, p<0.001, respectively). For the prediction of RCI, the AUC of Patte, SFA, Kim, and Lhee were 0.581, 0.642, 0.723, and 0.751, respectively. The AUC of Patte was significantly smaller than the other three classifications (p=0.01, p<0.001, p<0.001, respectively), and Kim and Lhee was significantly greater than that of SFA. The cut-off points of Kim and Lhee were at the center and the medial one-third of the humeral head. Those of SFA and Patte were at the lower edge of the anatomical neck and the glenoid rim. Conclusion: Among 4 classification systems of SSP tendon retraction, Lhee classification was most valuable in predicting reparability and RCI after ARCR.

Category: Shoulder - Rotator Cuff

Differentiating Partial From Complete Rotator Cuff Tears Using Thermal Imaging in Patients Scheduled for Arthroscopic Repair

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Summary: In this study we present clinical evidence showing that thermal imaging may be a useful, simple, low-cost adjunct imaging tool for evaluation of rotator-cuff tears and may provide additional capability for identification of complete versus partial tears before surgery.

Data: Objective: This study evaluates the usefulness of smartphone-based thermal imaging for diagnosis of rotator-cuff tears (RCT) and whether this imaging modality can discriminate between partial and complete tears. Methods: Forty-five patients (age 55±8 years old; male:female=27:18; complete:partial=24:21) with moderate-to-severe limitation in range of motion (ROM), and scheduled to undergo primary rotator cuff arthroscopic repair, participated (ethics-approval #HFH-219-2020). FLIR images were captured and skin temperature (ST) measured over the rotator cuff tear (RCT) and over the trapezius away from the tear from the superior and posterior aspects respectively using a FLIR-One Pro thermal camera (FLIR Systems, Wilsonville, OR, USA) attached to a smartphone incorporating FLIRtools software. The primary outcomes were (1) the difference between the ST over the RCT and that of similar sites of the contralateral, unaffected shoulder (7ST-RCT), and (2) the difference between the ST over the uninjured trapezius on the side of the RCT and that of the unaffected side (7ST-trapezius). Tear status (complete/partial) was determined from the surgical records. Results: When considering all patients together, the ST over the RCT, posteriorolateral to the acromioclavicular (AC) joint, was significantly warmer on the affected vs the unaffected side (mean±SD[n=45]: 7ST-RCT=0.34±0.14, p=0.008 by paired t-test). No difference in ST was detected over the area of the trapezius between affected and unaffected sides. However, patients with complete tear, had a greater (warmer) ?ST-RCT than those with partial tear (7ST-RCT, complete [n=24] vs partial [n=21]: 0.45<0.17, vs-0.22, p<0.008 vs p=0.162). Conclusions: These studies provide evidence that thermal imaging may be a useful, simple, low-cost adjunct imaging tool for evaluation of rotator-cuff tears and may provide additional capability for identification of complete versus partial tears and the determination of the need for surgical intervention. Further studies involving advanced thermal properties are in progress.

Category: Shoulder - Rotator Cuff

The Validity and Interrater Reliability of a New Non-Invasive Model for Objective Measurements of Scapular Kinematics

Abstract ID# 22021
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Summary: The presentation of a promising model for quantitative measurements and objective assessment of scapular kinematics for clinical use.

Data: Background: Primary or secondary scapular dyskinesia is characterized by abnormal scapular rotations. It can be painful and impair the shoulder function. A skin marker-based motion capture model providing quantitative measures of the rotations of the scapula was recently developed and can potentially be used to diagnose and monitor scapular dyskinesia. Aim: To investigate the concurrent validity and the interrater reliability of a new model for analysis of scapular kinematics. Materials and Methods: Twelve infrared cameras were used to track reflections from moving skin markers in the motion capture model. A strict protocol for placement of the skin markers was followed. Shoulder range of motion (ROM) and activities of daily living (ADL) were tested in healthy volunteers. To investigate the validity, the skin marker-based model was compared to a gold standard through simultaneous data collection from markers fitted to an intracortical pin in the scapula. Interrater reliability was tested in a different group of healthy volunteers by comparing the skin marker-based protocol performed by two investigators blinded to each other’s results. The mean Root Mean Square Error (RMSE) was calculated for each tested motion to determine the validity. The interrater reliability was determined as Intraclass Correlation (ICC2,1) for each tested motion. Results: Eight subjects were included in the validity test: female/male=2/6, mean (standard deviation) age 35.0 (3.0) and BMI 23.4 (3.3). The mean RMSE of all scapular rotations ranged 2.3-6.7 during shoulder ROM and 2.4-7.6 during ADL. The highest errors were seen for movements in front of the body: sagittal/scapular plane flexion, hair combing and eating. In 19 out of 24 measurements, the model showed larger range of rotation than the gold standard. In the reliability test, 20 subjects were included: female/male=8/12, mean (standard deviation) age 31.4 (9.4) and BMI 22.9 (1.7), ICC for measuring protraction ranged 0.07-0.60 during ROM and 0.27-0.69 for ADL. Correspondingly, ICC ranged 0.01-0.64 and 0.38-0.60 for upward rotation, and 0.25-0.83 and 0.25-0.62 for anterior tilt. Conclusion: Our results indicate that the model’s validity and reliability are task dependent and interpretation should be made with caution. The model provides quantitative measurements for objective assessment of the scapular movements and can be an important supplement to the clinical examination. Taking the inherent limitations of the method into consideration, the model is promising for clinical use.

Category: Shoulder - Rotator Cuff

Subacromial Platelet Rich Plasma Injections For Rotator Cuff Tendinopathy Are Partial Thickness Tears Associated With Poor Functional Outcomes?

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